**MODULE 3 – TIMERS - SOLVED TASKS**

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| **Practical tasks**  **Lab activity 1: ON/OFF delay timer** |
| Objective: understand and use ON/OFF delay timer   1. Try the following control routines, for how many seconds the green light stays ON in each case? write down your comments:  |  |  | | --- | --- | | untitled.bmp | | | **Action** | **Comments** | | Press the green PB for three seconds and then release it. | Green light stays OFF  Green light stays ON for “0” sec | | Press the green PB for seven seconds and then release it. | Green light goes ON after 5 seconds and stays ON 2 seconds after releasing the green PB.  In total green light stays ON for “4” sec | | untitled2.bmp | | | **Action** | **Comments** | | Switch ON the selector switch for 10 seconds then switch it OFF | Green light goes ON after 5 seconds and stays ON 2 seconds after switching off the selector switch.  In total green light stays ON for “7” sec |  1. Which input is better to be used with the ON/OFF programming block switch or pushbutton? Why?   Switch, the output of the ON/OFF programming block can’t be switched ON using a normally open PB unless it is kept pressed for more than the ON delay time.   1. The conveyor belt (Q8) is required to start 10 seconds after switching ON the selector switch (I4), and it must stay ON for 20 seconds after switching OFF the same selector switch. 2. Create and test the program for this task using one timer only.  |  | | --- | | untitled.bmp |  1. Create and test the program for this task using two timers.  |  | | --- | | untitled.bmp |  1. Compare between program (a) and program (b) in terms of the advantage for each one?   In program (a) using one timer saves memory.  In program (b) using 2 timers gives the operator ability to use emergency PB to turn OFF the output any time. |
| **Lab activity 2: Two-routine time sequence process** | | |
| **Objective:** use single timer and multiple timers with memory flag to create a two-routine time sequence process.  Use the Edutrainer kit and LOGO! soft comfort software to create and implement the following control task:  The system is started with a selector switch (I4), once the switch is turned ON the conveyer belt (Q8) will start moving for 10 seconds. After 10 seconds the belt will turn OFF for 5 seconds, as soon as the belt stops moving a green light (Q1) turns ON to indicate that the bottle is being filled. This loop will run for infinite time unless the system is turned OFF using the main selector switch.   1. Draw the FBD for this task.   (Note: there are many correct solutions for this task)   |  | | --- | | Solution #1untitled.bmp | | Solution #2  untitled.bmp |  1. Run and test your program. | | |
| **Lab activity 3: Asynchronous pulse generator** | |
| **Objective:** use asynchronous pulse generator programming block in time sequence processes.   1. Repeat lab activity 2 using Asynchronous pulse generator block 2. Draw the FBD for the previous control task.  |  | | --- | | kam sign.bmp |  1. Run and test your program.  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 1. Table 3.2 shows the ON time for each light in a traffic light signal. Create the function block diagram that can be used to control this traffic light signal as follows: | |  |  | | --- | --- | | **Light** | **ON time** | | Red (Q1) | 30 Sec | | Yellow (Q2) | 5 Sec | | Green (Q3) | 20 Sec |   Table 3.2 Traffic signal | | Red🡪Yellow🡪Green🡪 Red (again) | |   Hint: See the timing diagram given below. Use Asynchronous pulse generator with the red light. (there is more than one solution)   |  | | --- | | untitled2.bmp | | Timing diagram for traffic light signal | | |

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| **Lab activity 4: Weekly timer** |
| **Objective:** use Weekly timer programming block.   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | You are required to create a program that can be used to control ATHS bell (Q1), the bell should ring for 1 minuet at the end of each period, and at the end of each break, timings are given in the table. | |  |  | | --- | --- | | **Period** | **End time** | | 1 | 8:15 am | | 2 | 9:05 am | | 3 | 9:55 am | | Break | 10:20 am | | 4 | 11:05 am | | 5 | 11:55 am | | 6 | 12:45 pm | | 7 | 1:35 pm | | Break | 2:15 pm | | 8 | 3:00 pm | |  1. Draw the FBD for this task.  |  | | --- | | untitled2.bmp |  1. Use the LOGO! Soft comfort to simulate and test your program (you can adjust the day and time for testing). |

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